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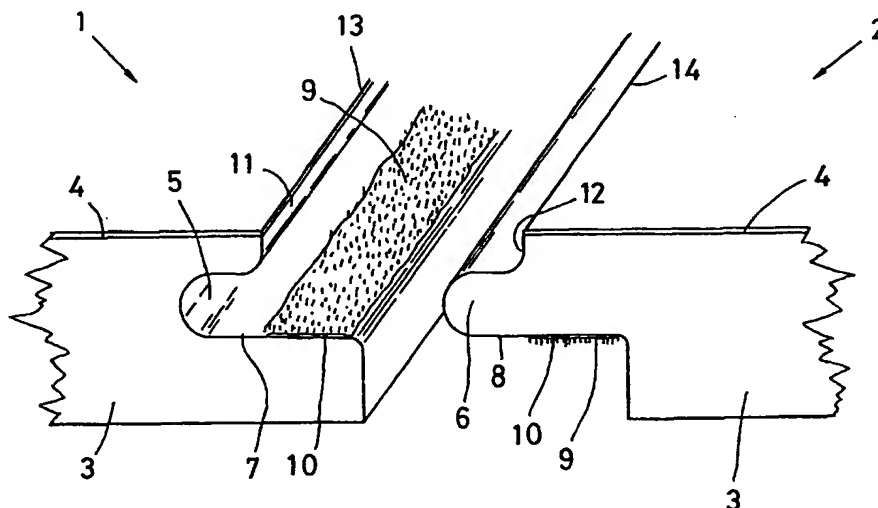
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(54) Title: AN ARRANGEMENT FOR JOINTING TOGETHER ADJACENT PIECES OF FLOOR COVERING MATERIAL



## (57) Abstract

In an arrangement for interconnecting adjacent pieces (1, 2) of floor covering material, edge portions of the pieces facing one another in a joint are profiled such that the profilings include mutually facing surfaces (7, 8, 15, 16, 18, 19, 20) on both pieces. On or between these surfaces, there are provided interconnecting devices (9) for interconnecting adjacent pieces. The profilings have, besides the mutually facing surfaces (7, 8, 15, 16, 18, 19, 20), guide surfaces for form-locked guiding of the pieces (1, 2) in the vertical direction in relation to one another. The mutually facing surfaces (7, 8, 15, 16, 18, 19, 20) have loose fit or slight mutual spacing, while the guide surfaces have tighter mutual fit.

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## AN ARRANGEMENT FOR JOINTING TOGETHER ADJACENT PIECES OF FLOOR COVERING MATERIAL

## TECHNICAL FIELD

5 The present invention relates to an arrangement for jointing together adjacent pieces of floor covering material, edge portions of the pieces facing towards one another in a joint being profiled such that the profiles include mutually facing surfaces on the two pieces, there being disposed on or  
10 between these surfaces interconnecting devices for interconnecting adjacent pieces.

## BACKGROUND ART

Patent Specification SE 503 917 C2 discloses a structure of the type intimated  
15 by way of introduction. According to this Patent Specification, the pieces of floor covering material have, in their mutually meeting edge portions, tongues and grooves which engage with each other. At least one, but preferably two of the surfaces included in the tongues and grooves and facing towards one another are provided with a flocking which acts as an  
20 interconnecting device for interconnecting the adjacent pieces.

A flocking of the type which is described in the above-mentioned Patent Specification is realised in that an adhesive layer is placed on the surface of that floor covering piece which is to be provided with the flocking,  
25 whereafter short fibre pieces are applied in the as yet undried or unhardened adhesive layer. Before this layer has dried or hardened, a powerful electrostatic field is applied which causes the individual fibres to rise to positions approximately at right angles to the substrate. After drying or hardening, the flocking will have a structure which approximates plush.

30 In the production of a flocking, it is impossible to control, in an accurate manner, the structure height which the flocking requires. From this it follows that when two flockings are laid on one another, it will not be possible reliably to control the tolerance in the vertical direction. As a result, the fit  
35 which is to be used in the tongues and grooves, i.e. the surfaces carrying the flockings, will be difficult to predict.

In floor covering material of the type which, on its upper face, has a high pressure laminate, even extremely small height differences are visible between adjacent pieces of floor covering material. Such small differences as 2/100th part of a millimetre may be clearly visible and fully tangible, for which reason a floor with such tolerances is seen as being of poor quality.

Against this background, the tolerance problems caused by the flockings have entailed severe quality and appearance problems as regards floors bonded in the manner under consideration here.

A further factor which must be considered is that a flocking which is under lengthy pressure loading could possibly lose its interconnecting properties, since the individual fibres could be permanently bent or deformed.

A further problem which might possibly arise (of course depending upon the type of adhesive employed) is that flockings pressed hard against one another could "fuse together" to an unopenable joint whereby at least one of the advantages of jointing by means of flocking would be lost.

## PROBLEM STRUCTURE

The present invention thus has for its object to design the arrangement intimated by way of introduction such that the drawbacks inherent in prior art techniques are obviated. In particular, the present invention has for its object to design the structure intimated by way of introduction such that tolerance problems are avoided, and in particular tolerance problems relating to the position of mutually meeting upper surfaces on pieces of floor covering material. Further, the present invention has for its object to realise an arrangement which prevents long-term effects in employed interconnecting devices, such as permanent deformations or "fusion". Finally, the present invention also has for its object to realise an arrangement which is simple and economical to manufacture without considerable overhead costs.

## SOLUTION

The objects forming the basis of the present invention will be attained if the arrangement intimated by way of introduction is characterized in that the  
5    profilings, besides the mutually facing surfaces, have guide surfaces for the form-locked guiding of the pieces in the vertical direction in relation to one another.

Further advantages will be attained according to the present invention if the  
10    subject matter of the present invention is also given one or more of the characterizing features as set forth in appended Claims 2-6.

## BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

15    The present invention will now be described in greater detail hereinbelow with reference to the accompanying Drawings. In the accompanying Drawings:

20    Fig. 1        is a perspective view of two meeting edge portions of a floor covering material;

      Fig. 2        is a pure end elevation of two meeting edge portions of a floor covering material in a modified embodiment thereof;

25    Fig. 3        is a view corresponding to that of Fig. 2 showing yet a further embodiment of the present invention;

      Fig. 4        is a view corresponding to that of Fig. 2 showing still a further embodiment of the present invention; and

30    Fig. 5        shows yet a further modified embodiment of the present invention in a view corresponding to that of Fig. 2.

## DESCRIPTION OF PREFERRED EMBODIMENTS

35    Fig. 1 shows in perspective fundamentally how the jointing of adjacent

pieces of floor covering material proceeds according to the invention. However, the detailed design is not according to the invention. The description of Fig. 1 is, therefore, only provided to afford a better understanding of the principles on which the present invention is based.

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In Fig. 1, reference numerals 1 and 2 refer to pieces of a floor covering material which are intended to be interconnected or jointed together in accordance with the principles relevant in the present invention. The pieces 1 and 2 are preferably of identical design, for which reason the piece 1 (to the left in the Figure) has a left-hand edge (not shown on the Drawing) which is designed in the same manner as the left-hand edge of the piece 2 shown in the Figure. Conversely, the opposite naturally applies such that the piece 2 has a right-hand edge (not shown on the Drawing) which corresponds to the right-hand edge of the piece 1 according to the Figure. The end surfaces of the pieces 1 and 2 may be cut as shown in the Figure, but may also be profiled in the manner shown in respect of the pieces 1 and 2.

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20

Each piece 1 and 2 has a bearing, panel-shaped portion 3 which may consist of chipboard, MDF board, core board, solid wood etc. Further, each piece has a wear surface 4 which preferably consists of a high pressure laminate or the like. On their underside, the pieces have barrier layers which prevent the pieces from warping in the event of variations in humidity and temperature.

25

Alternatively, the pieces 1 and 2 may, in their central region counting in the vertical (thickness) direction, have a core of the same material type as the bearing portion 3. On the upper side of this core, there is disposed a wear layer of a relatively thick wood veneer, while there is disposed on the underside a corresponding barrier layer.

30

In the embodiment with a high pressure laminate in the wear surface 4, this high pressure laminate is, along the edge lines 13 and 14, cut at right angles to the plane of extent of the wear surface. Suitably, the subjacent, transverse surfaces 11 and 12, respectively, are also approximately at right angles to the surface plane of the floor covering material. That the edge lines 13 and 14 may be considered as right-angled, sharp corners implies that even the smallest deviation in the vertical direction between these lines will be clearly

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seen in a laid floor and also be felt. As small differences as 0.02 mm may be sufficient to ruin the appearance of a floor.

5 In the embodiment with the wear layer 4 consisting of relatively thick wood veneer, this problem is less serious, since such wood veneer cannot be cut with as sharp edge lines as high pressure laminate. Instead, the veneer usually has, along the edges 13 and 14, slight bevels which may possibly conceal minor inaccuracies in the positions of the upper surfaces of the pieces.

10 Regardless of how the pieces 1 and 2 constructed of different layers, they have, along their edge portions facing towards one another in a joint, profiles which, on the one piece, consist of a groove-shaped accommodation space 5 in which a corresponding bead-shaped projection 6 on the other piece may  
15 be accommodated. Suitably, the accommodation space and the projection are approximately complementary to one another.

The profilings of the two pieces 1 and 2 (not only according to Fig. 1 but also in the embodiments according to the other Figures) further include, besides  
20 the accommodation space 5 and the projection 6, surfaces 7 and 8 which face towards one another in the jointed state of the pieces. On or between these surfaces, the pieces 1 and 2 have interconnecting devices which, in the embodiment illustrated in Fig. 1, consist of flockings 9. The flockings act as friction devices, which strongly impede or prevent displacement between  
25 the pieces 1 and 2 parallel with their plane of extent. Preferably, the surfaces 7 and 8 with the interconnecting devices are approximately parallel with the plane of extent of the pieces 1 and 2 so that the one surface 7 will be turned to face upwards and the other surface 8 will be turned to face downwards. Possibly, only one of the surface 7 and 8 may be provided with the  
30 interconnecting device or friction device for interconnecting the adjacent pieces 1 and 2.

On application of the flocking or flockings 9, the relevant surface 7 or 8, or both, is provided with a band-shaped application of an adhesive 10 in which  
35 short pieces of fibre are fixed. By exposing the fibres to an electrostatic field, these will be charged and repel one another, for which reason they will,

before the adhesive has dried or hardened, align themselves in directions which are substantially at right angles, or at least transversely directed, in relation to the plane of the surfaces 7 and 8. Given that the surfaces portions coated with the flockings 9 are located substantially outside those surfaces which define the accommodation space 5 and the projection 6, no problems occur as regards the electrostatic field. An inner coating in a groove of the type represented by the accommodation space 5 (and also the embodiment according to Fig. 2) could, on the other hand, possibly present difficulties.

10 The pieces 1 and 2 are jointed together in the following manner. The left-hand piece 1 in the Figure is considered as lying fixed on a substrate and is therefore assumed to form part of an already laid floor covering. The right-hand piece 2 in the Figure is inclined at an angle of 15-30° in relation to the piece 1 so that the arched or rounded edge of the projection 6 may slide over the flocking 9 in towards the accommodation space 5. On insertion of the projection 6 into the accommodation space, the right-hand piece 2 is gradually pivoted until it assumes the same plane as the left-hand piece. During this combined moving together and pivoting action, the flockings 9 will come into mesh with one another increasingly as the movement continues. Complete mesh does not occur until the pieces 1 and 2 approach the completely jointed position in a common plane. In order to minimise or wholly eliminate any possible gap between the edge lines 13 and 14 of the wear surface 4, and the subjacent transverse surfaces 11 and 13, it may possibly be appropriate to subject the right-hand edge of the right-hand piece to careful impact during the final phase of the closure together of the pieces.

In the completely united position of the pieces 1 and 2 according to Fig. 1, the both flockings 9 will thus rest on each other and also transfer loading from at least the right-hand piece 2 to the left-hand piece 1 in the vertical direction. As a result, it will be readily be perceived that it is the thickness of the two flockings that determines the vertical tolerance of the two edge lines 13 and 14 in relation to one another. In the same manner, these tolerances will be influenced by any possible settling or "fusion" proceeding with the passage of time of the flockings 9 or the adhesive 10 which is included in the flockings.



The embodiments according to Figs. 4 and 5 are based on the same jointing technique as that described with reference to Fig. 1. However, the above-considered tolerance problems have here been eliminated.

5 In General, the present invention may be described such that the profilings which are disposed along mutually meeting edges of the two pieces 1 and 2, besides the mutually facing surfaces 7 and 8 which are thus provided with the interconnecting device or interconnecting devices, also include guide surfaces for form-locked guiding of the pieces 1 and 2 at least in the vertical  
10 direction in relation to one another.

In the embodiment according to Fig. 4, the right-hand piece 2 is technically identical with the right-hand piece 2 according to Fig. 1. This implies that the guide surfaces for form-locked guiding in the vertical direction of the pieces  
15 in relation to one another may be considered as the upper side and lower side of the bead-shaped projection 6.

As regards the left-hand piece 1 in the embodiment according to Fig. 4, the guide surfaces may correspondingly be considered as the upper and lower  
20 defining surfaces of the elongate groove 5.

The left-hand piece 1 in Fig. 4 differs from the left-hand piece 1 in Fig. 1 in that the surface 15 which carries the flocking 9 is no longer a continuation of the defining surface 7 of the groove 5. The flocking surface 15 is countersunk  
25 under the surface 7 a distance which is sufficient to ensure that the fit in the vertical direction between the pieces 1 and 2 is guided by the guide surfaces on the projection 6 and the groove 5. The countersinking of the flocking surface 15 is further of such magnitude that the flocking 9 and its adhesive are relieved of excessive compression loading such that permanent  
30 deformations in the adhesive or the fibres are thereby avoided, at the same time as the adhesive layers are prevented from "fusing together". The countersinking of the flocking surface 15 beneath the surface 7 must be arrived at experimentally, but may be expected to lie in the range of between 0.1 and 0.6 mm.

35 In the production of the profiling of the left-hand piece 1 in Fig. 4, no extra work arises since all surfaces in the profiling may be milled using one and

the same milling machine.

5 In Fig. 5, a part of the material which defined the surface 8 and which was located on the underside of the projection 6 on the right-hand piece 2 has been eliminated such that the surface 16 on which the flocking 9 is secured is located on a higher level or inside the original surface 8. This implies int. al. that the projection 6 will have a slightly different profile. In order to ensure the guide surfaces for form-locked guiding, the left-hand piece 1 in Fig. 5 has been given an elevated surface 17 which lies at a certain distance above the original level of the lower defining surface of the groove 5 indicated by broken lines and by reference numeral 7'.

10 In Fig. 5, reference numerals 7 and 8 are taken to signify the position of the mutually facing surfaces as they appeared in the embodiment according to Fig. 1. This implies that the narrow portion of the downwardly facing surface 8 on the right-hand piece 2 will also form a guide surface for form-locked cooperation with the surface 7 on the left-hand piece 1.

20 In the embodiment according to Fig. 5, the surfaces defining the groove 5 (and particularly its elevated lower defining surface 17) will thus, together with the remainder of the surface 7, form the guide surfaces on the left-hand piece 1. In a corresponding manner, the upper surface of the projection 6 and that portion of the flocking surface 16 which is located on the projection 6 will form guide surfaces together with the remainder of the surface 8.

25 In the embodiment according to Fig. 2, a joint is intended where the jointing includes tongue and groove structure and where the flocking or flockings may be located on each tongue and groove. The left-hand piece 1 has an undeformed tongue with the flocking 9 on the underside, while the right-hand piece 2 has the groove broadened in an outer portion so that a flocking surface 18 is formed there which is located beneath the original contour line of the groove.

30 The guide surfaces for form-locked guiding of the pieces 1 and 2 in relation to one another consist, in this embodiment, of the upper side of the tongue 6,

as well as its outer end region and its lower, free-defining surface, i.e. that part of the lower surface which is not coated with flocking 9. Correspondingly, the guide surfaces on the right-hand piece 2 consist of the upper and inner defining surfaces of the groove 5, as well as that portion of the lower defining surface of the groove which remains once the flocking surface 18 has been produced.

In the embodiment according to Fig. 2, the profilings have double projections and grooves. In this embodiment, both of the mutually facing surfaces 7 and 8 are modified in both configuration and tolerances so that both will have flocking surfaces 19, 20, respectively which lie inside the original surfaces 7 and 8, as regards the left-hand piece 1 above the surface 7 and, as regards the right-hand piece 2, below the surface 8.

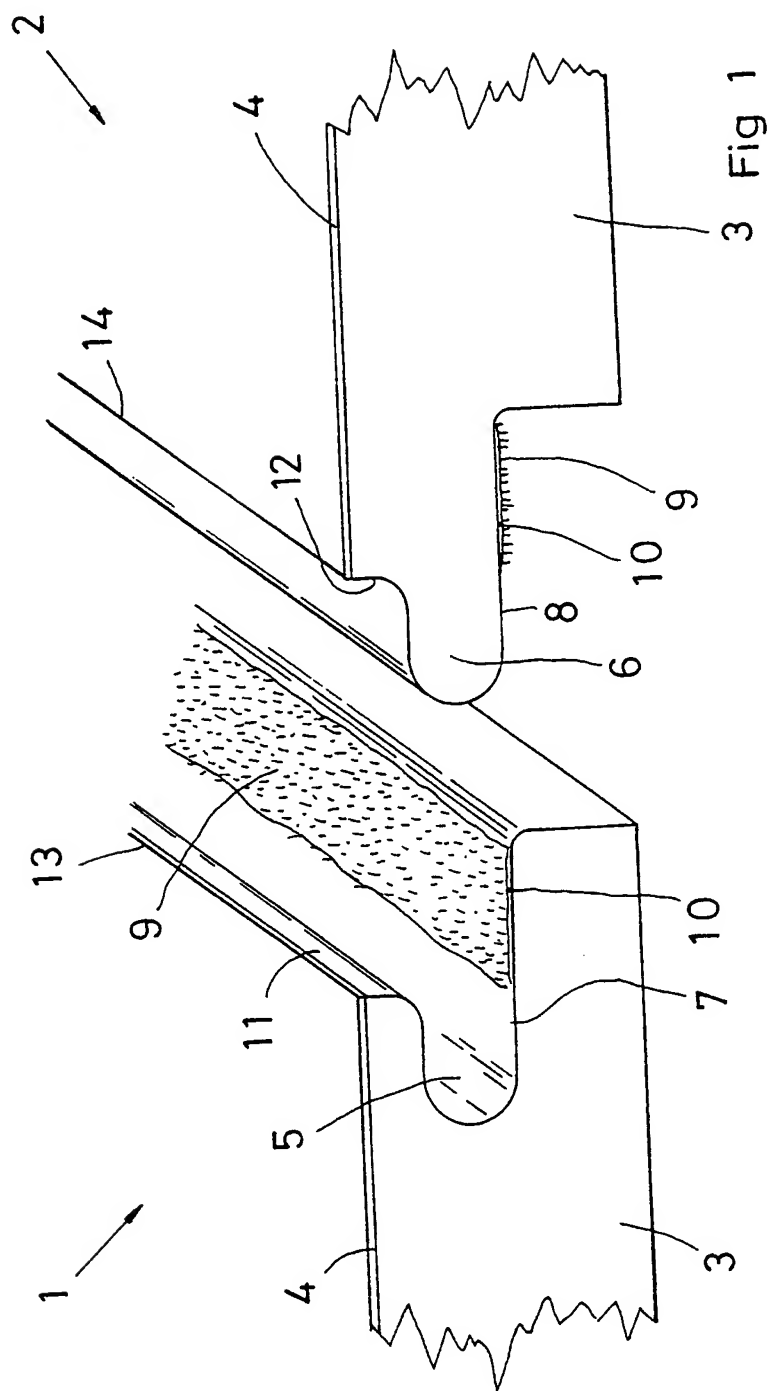
In the embodiment according to Fig. 3, it may be appropriate to divide up the "retraction" of the flocking surfaces 19 and 20 inside the mutually facing surfaces 7 and 8, respectively, approximately equally on both pieces 1 and 2.

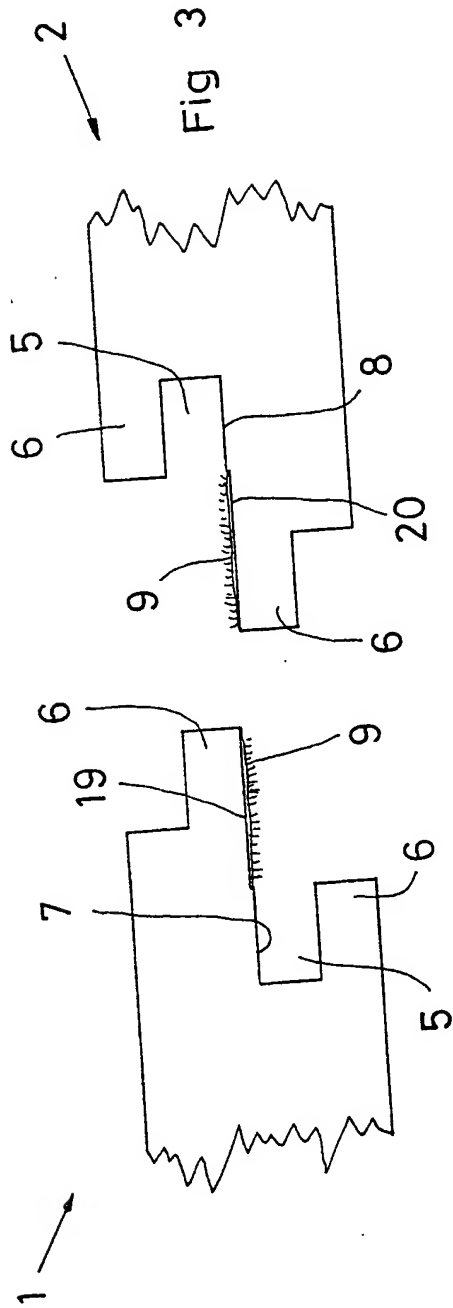
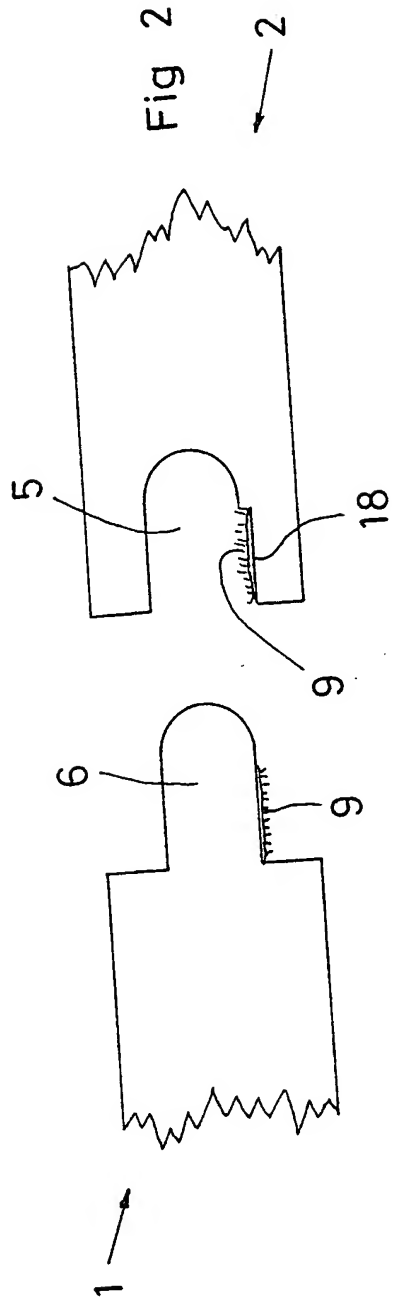
#### DESCRIPTION OF ALTERNATIVE EMBODIMENT

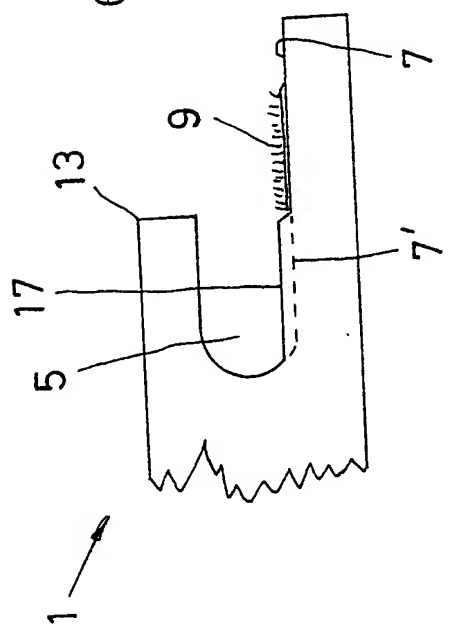
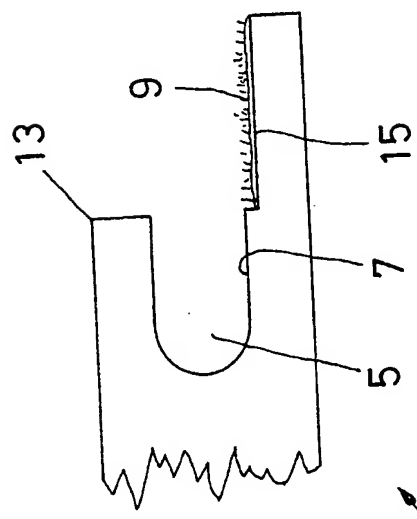
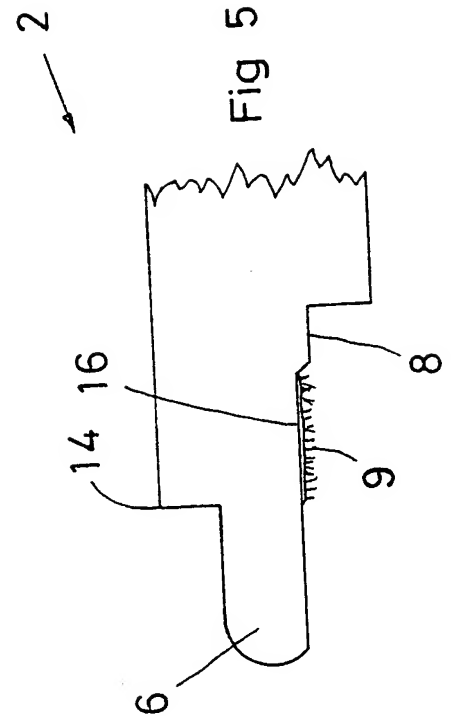
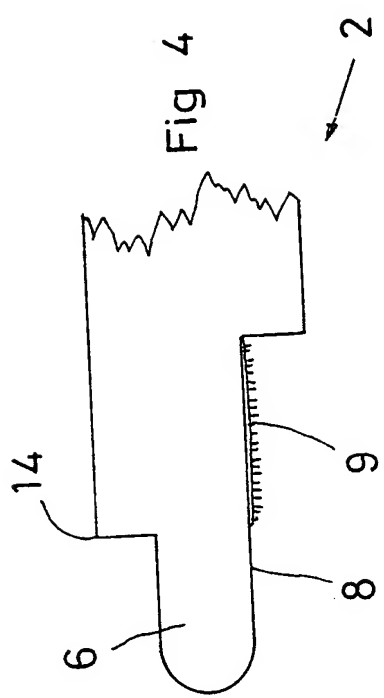
In the foregoing, the flocking or flockings - both single and double flockings may be employed in a joint - have been used as examples of interconnecting devices for interconnecting adjacent pieces 1 and 2. However, as alternative interconnecting devices, it is also conceivable to employ strip-shaped material pieces which, secured on relevant surfaces of the profilings of the pieces, offer increased friction between the pieces. Examples of such friction devices may be strip-shaped bands of rubber, plastic or foamed rubber which may abut against identical or similar friction devices, but which may also abut against roughened or coarsened surfaces on the wooden material in an adjacent piece. A further example of an applicable interconnecting device is an adhesive-coated surface in which a friction-increasing material is secured, such as, for example, sand, plastic or rubber particles, etc. Further, tacky strips or strip-shaped applications of tacky agent may be employed which, if the pieces are to be able to be separated from one another, may not be permanently joined together. In principle, any friction-increasing arrangement on or between mutually facing surfaces on both pieces could serve the purpose of interconnecting device.

## WHAT IS CLAIMED IS:

1. An arrangement for jointing together adjacent pieces (1, 2) of floor covering material, edge portions of the pieces facing towards one another in a joint being profiled such that the profilings include mutually facing surfaces (7, 8, 15, 16, 18, 19, 20) on both pieces, there being disposed on or between these surfaces interconnecting devices (9) for interconnecting adjacent pieces, characterized in that the profilings, besides the mutually facing surfaces (7, 8, 15, 16, 18, 19, 20), have guide surfaces for form-locked guiding of the pieces (1, 2) in the vertical direction in relation to one another.
2. The arrangement as claimed in Claim 1, characterized in that said mutually facing surfaces (7, 8, 15, 16, 18, 19, 20) have loose fit or slight mutual spacing, while the guide surfaces have tighter mutual fit.
3. The arrangement as claimed in any of Claims 1 or 2, characterized in that said interconnecting device is a device for realising increased friction between said mutually facing surfaces (7, 8, 15, 16, 18, 19, 20).
4. The arrangement as claimed in any of Claims 1 or 2, characterized in that said interconnecting device is a device for realising adhesion between said mutually facing surfaces (7, 8, 15, 16, 18, 19, 20).
5. The arrangement as claimed in any of Claims 1 or 2, characterized in that said interconnecting device is a device for realising mechanical engagement between said mutually facing surfaces (7, 8, 15, 16, 18, 19, 20).
6. The arrangement as claimed in any of Claims 1 or 2, characterized in that said interconnecting device is a flocking (9) on at least one of said mutually facing surfaces (7, 8, 15, 16, 18, 19, 20).







# INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 97/01781

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: E04F 15/02, E04F 15/14

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: E04F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,OK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9627719 A1 (PERSTORP FLOORING AB), 12 Sept 1996 (12.09.96) --	1,3-5
A	WO 9623942 A1 (AB GOLVABIA), 8 August 1996 (08.08.96), figure 4, abstract --	1-6
A	EP 0161233 A1 (ROUSSEAU, G.O.), 13 November 1985 (13.11.85), figures 5,6 -- -----	2

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

03/02/98

International application No.

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